

## Installation, Service and Parts List for 35X Series Armature Actuated Brakes

### Important

Please read these instructions carefully before installing, operating, or servicing your Stearns brake. Failure to comply with these instructions could cause injury to personnel and/or damage to property if the brake is installed or operated incorrectly. For definition of limited warranty/liability, contact Rexnord Industries, Inc., Stearns Division, 5150 S. International Dr., Cudahy, Wisconsin 53110, (414) 272-1100.

OEM's and subsystem suppliers, please forward these instructions with your components to the final user.

### Caution

1. Servicing shall be in compliance with applicable local safety codes including Occupational Safety and Health Act (OSHA). All wiring and electrical connections must comply with the National Electric Code (NEC) and local electric codes in effect.
2. To prevent an electrical hazard, disconnect power source before working on the brake. If power disconnect point is out of sight, lock disconnect in the *off* position and tag to prevent accidental application of power to system.
3. To avoid damage to internal power supply, hipot testing should not exceed 1500 volts for one second. Brake coil leads must be connected together.
4. Heat developed during normal operation (135°C) of the brake may be hot enough to be painful or cause injury. Be careful when touching exterior surfaces. Allow sufficient time for the brake to cool before servicing.
5. After usage, the brake will contain burnt and degraded friction material dust. This dust should be removed before servicing or adjusting the brake.  
  
DO NOT blow off dust using an air hose. It is important to avoid dispersing dust into the air or inhaling it, as this may be dangerous to your health.
  - a) Wear a filtered mask or a respirator while removing dust.
  - b) Use a vacuum cleaner or a soft brush to remove dust from the brake. When brushing, avoid causing the dust to become airborne. Collect the dust in a container, such as a bag, which can be sealed off.
6. Maximum operating ambient temperature for these brakes should not exceed 40°C (104° F).

### I. Installation

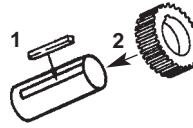
**Note 1:** Position of hub should allow full engagement of friction disc without interfering with the movement of the armature. **Motor shaft end float should not exceed .020". Shaft runout should be within .002" TIR. Motor mounting surface should be flat and perpendicular to within .004" of motor shaft.**

**Note 2:** Keep grease and oil from contacting friction surfaces.

**Note 3:** Hub should be a tight sliding fit. **For shrink fit hub, consult factory.**

### I. Installation

#### Step 1



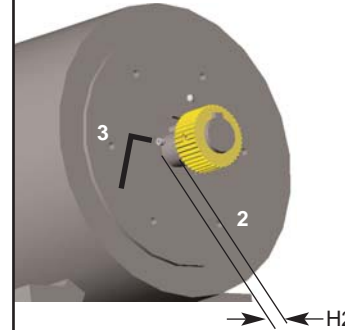
1. Place key in motor shaft.
2. Position hub per Table A.
3. Tighten set screws per Table B.

**Table A (H2)**

Brake Model	Bolt Circle	Metric	English
35X-7	7.25		
	9.00	38 mm	1.50"
	11.00	39.5 mm	1.55"
35X-8	9.00	40.5 mm	1.60"
35X-9	11.00	40.5 mm	1.60"

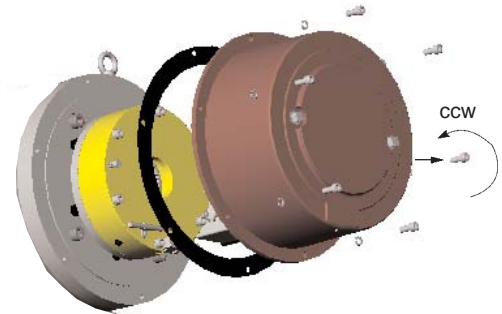
**Table B**

Brake Model	Bolt Circle	Metric	English	Hex Wrench
35X-7	7.25			
	9.00	32.5 Nm	24 lb-ft	3/16"
	11.00			
35X-8	9.00	32.5 Nm	24 lb-ft	3/16"
35X-9	11.00	70.5 Nm	52 lb-ft	1/4"



#### Step 2

Remove 6 housing bolts (8mm hex wrench) lift housing and gasket from brake assembly/mounting plate.

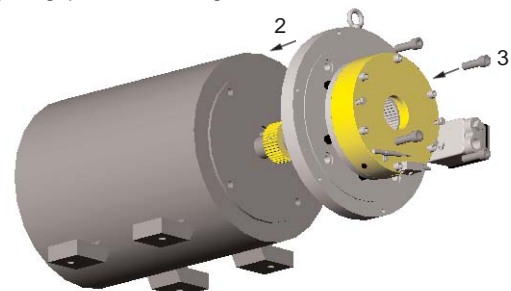


#### Step 3 Mounting Instructions: 35X-7 and 35X-8 with 11.00" BC mounting.

**Note 1:** It may be necessary to manually release the brake to align the mounting register if the pressure plate has shifted in shipment.

1. Insert O-ring in groove of register mounting face.
2. Position brake assembly over hub using care to align spline teeth, and slide the assembly up against the motor register face.
3. Insert four (4) mounting bolts (5/8 - 11 x 1.25") tighten to manufacturers specifications using 1/2" hex wrench.

**Note 2:** Release air gap is factory set per Table D. Verify air gap after mounting brake to motor.



Installation procedure continued on reverse side.

## Installation continued

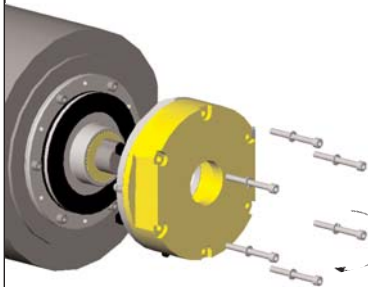
### Step 4 Mounting Instructions: 35X-7 with 7.25" and 9.00" BC Mounting, 35X-8 with 9.00" BC mounting and 35X-9 with 11.00" BC mounting

1. Remove the six mag body to adapter plate mounting bolts to separate the adapter plate from the mag body.
2. Insert O-ring in groove of register mounting face.
3. Bolt adapter plate to motor register with four mounting bolts. (1/2-13 x 1.25" for 7.25" and 9.00" BC and 5/8-11 x 1.25" for 11.00" BC.) Tighten to manufacturers specification using 3/8" hex wrench for 7.25" and 9.00" BC mounting. Use 1/2" hex wrench for 11.00" BC mounting.
4. Align carrier disc onto mounted hub and slide it into place against the mounting plate.
5. Position brake assembly over hub/carrier disc and slide up against the pressure plate. Tighten mounting bolts per Table C.

**Note:** Release air gap is factory set per Table D. Verify air gap after mounting brake to motor.

Table C

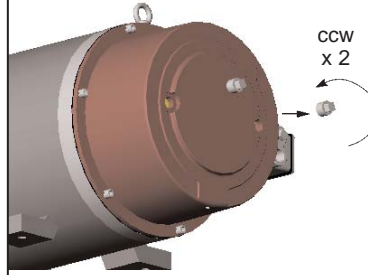
Brake Model	Bolt Circle	Mounting Bolt Torque		Hex Wrench
		Metric	English	
35X-7	196	19 Nm	14 lb-ft	6 mm
35X-8	230	38 Nm	28 lb-ft	8 mm
35X-9	278	38 Nm	28 lb-ft	8 mm



## II. Manual Release Engagement

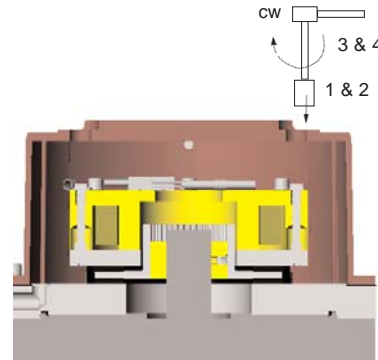
### Step 1

Remove access plugs from housing.



### Step 2

1. Insert a 13mm socket through the access hole and engage the release bolt.
2. Push down on the bolt while rotating the socket to engage the first threads of the bolt.
3. Tighten the release bolts until snug against the brake frame.
4. Tighten the bolts (cw) to 19-23 Nm (14-17 ft-lb) by alternately rotating each bolt 1/2 turn at a time.



### Step 5 Leadwire Connection Optional Conduit Box

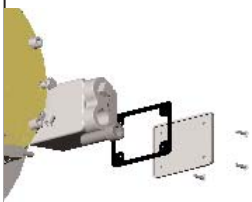
1. Loosen NPT plug and four (4) cover plate screws from junction box and remove.
2. Route leadwires into junction box and connect conduit to box.
3. Connect wiring as shown below for either the 9 terminal IP 56 or IP 65 conduit box assembly.
4. Replace junction box cover and tighten screws to seal.

#### 5-08-0050-00 IP 56 Assembly

TERM BLOCK = LEADWIRES		
1 = H1 YELLOW	}	Optional heater leads
2 = H2 YELLOW		
3 = S1 RED-COMMON	}	Optional brake release switch leads
4 = S2 WHITE - N.C		
5 = S3 BLUE - N.O.		
6 = B1 BLACK	}	Coil leads
7 = B2 BLACK		
8 = 1 EMPTY		
9 = 2 EMPTY		

#### 5-08-0051-00 IP 65 Assembly

TERM BLOCK = LEADWIRES		
1 = H1 YELLOW	}	Optional heater leads
2 = H2 YELLOW		
3 = L1 RED-COMMON	}	Optional brake release switch leads
4 = L2 WHITE - N.C		
5 = L3 BLUE - N.O.		
6 = W1 RED-COMMON	}	Optional brake wear switch leads
7 = W2 WHITE - N.C		
8 = W3 BLUE - N.O.	}	Coil leads
9 = B1 BLACK		
10 = B2 BLACK		

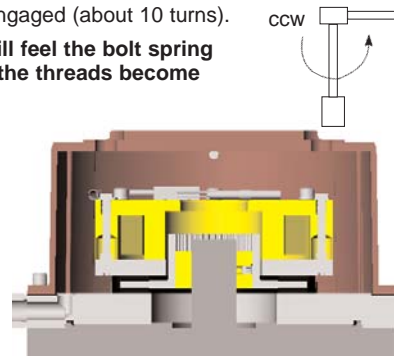


## III Manual Release Disengagement

### Step 1

Loosen (ccw) release bolts until threads are fully disengaged (about 10 turns).

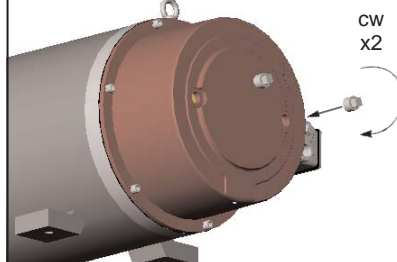
**Note:** You will feel the bolt spring loose when the threads become disengaged.



### Step 2

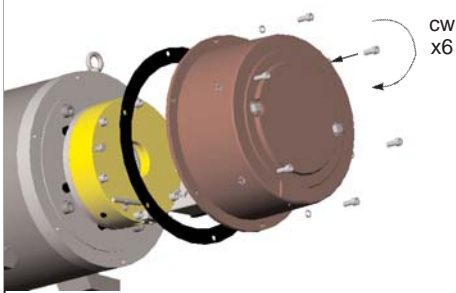
Replace access plugs.

**Note:** Ensure that gasket is securely located on the face of the plug. Add a drop of Loctite 242, or equivalent, to the thread of the plug and tighten to 28 lb-ft.



### Step 6

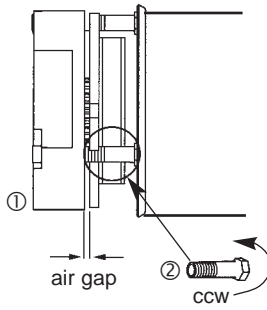
1. Replace gasket; align holes for housing bolts.
2. Place housing over brake making sure the manual release access holes align with the release bolts.
3. Insert six (6) housing bolts and tighten to 11.2 Nm (100 in-lb).



**CAUTION:** Be sure all internal wiring is clear of housing flange before replacing housing.

## IV. Air Gap Setting and Wear Adjust

Figure 1



Air gap is factory set per Table D. Set air gap is measured at the adjusting bolts, between the armature and magbody.

Table D - Minimum Air Gap

Brake Model	Bolt Circle	Air Gap
35X-7	196	.508-.610 mm
		.020-.024"
35X-8	230	.508-.610 mm
		.020-.024"
35X-9	278	.508-.610 mm
		.020-.024"

Normal friction disc wear will cause air gap to increase from original setting (Table D). Air gap should be readjusted when gap reaches dimension shown in Table E.

Table E - Maximum Air Gap

Brake Model	Hex Wrench	Max Gap	
		Metric	English
35X-7	3/4"	.89 mm	.035"
35X-8	3/4"	1.09 mm	.043"
35X-9	3/4"	1.40 mm	.055"

Table F - Disc Maximum Wear

Brake Model	Min Thickness	
	Metric	English
35X-7	9.27mm	0.365"
35X-8	11.68 mm	0.460"
35X-9	12.57 mm	0.495"

### Wear Adjustment

- Loosen six mounting bolts 1/2 turn.
- Rotate three alternate adjusting screws 1-1/2 turns counter-clockwise (as viewed from back side of brake).
- Rotate three remaining adjusting screws similarly ccw to achieve original gap (Table D).
- Retighten mounting bolts.
- Recheck gap. Repeat above procedures as necessary.
- Rotate three alternate adjust screws clockwise until snug with pressure plate.

**Note 1:** 90° ccw rotation is approximately 0.38mm (0.015") air gap increase.

**Note 2:** Brake discs should be replaced when they reach the thickness shown in Table F. Normally this will occur after 4-5 adjustments.

## V. Coil Wiring

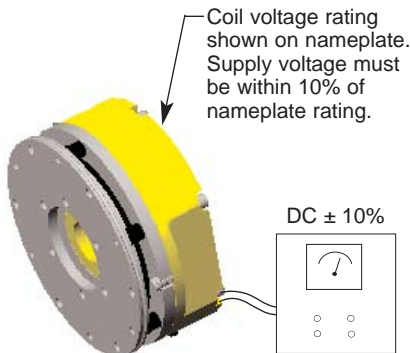
**Caution:** Brake wiring should only be carried out by qualified personnel.

Stearns brake coils are wound for DC voltage input at ± 10% of nameplate rating. Coil resistances shown below are for reference purposes. For applications where AC voltage is being rectified refer to AC control switching shown on next page.

Table G

Bolt Circle	196	230	278
Brake Model	35X-7	35X-8	35X-9
Voltage Rating ↓	Ohm (nominal value)*		
24	7.28	5.62	5.11
90	110.3	85.4	77.9
103	138.2	107.	97.7
180	426.8	330.7	302.6
205	534.6	414.3	379.3
258	669	650	605
414/432	1726	1649	1484

\* Resistance values at 20°C



## Electrical Considerations

**Caution:** Electrical work should only be performed by qualified personnel.

**Note 1:** All 35X series brakes have DC wound coils designed to accept DC line voltage at ± 10% of nameplate rating.

**Note 2:** When using a rectifier for AC line input, use table H to determine the proper DC coil rating requirement.

Table H

Line Voltage (AC)	Rectifier Type	Recommended Coil Voltage Rating	Stearns Rectifier Part Number*	Rectifier Output Voltage
100	full	90	412-0292-01K	90
110	full	103	412-0292-01K	99
115	full	103	412-0292-01K	103
127	full	103	412-0292-01K	115
208	full	180	412-0291-01K	187
220	full	205	412-0291-01K	198
230	full	205	412-0291-01K	207
240	full	205	412-0291-01K	216
220	half	103	412-0591-01K	99
230	half	103	412-0591-01K	103
240	half	103	412-0591-01K	108
380/400	half	180	412-0591-01K	171/180
415	half	180	412-0591-01K	187
460	half	205	412-0591-01K	207
575	half	260	412-0591-01K	259

**Note:** Fullwave rectifier output is 90% of AC line. Halfwave rectifier output is 45% of AC line input.

\* -0291- indicates 0.8 amp rating

\* -0292- indicates 1.6 amp rating

### AC Switching with Standard Rectifier

Switching on the AC line is the most common method of control when the rectifier is wired through the motor windings or motor contacts. However, brake engagement can take up to 5 times longer than DC switching. Switching on the AC line is not suitable for hoist and crane applications.

### Crane and Hoist Applications

For descending loads such as cranes and hoists or high inertia loads, the motor windings can develop regenerative voltage during deceleration which can delay the engagement of the brake when switching on the AC supply.

For these type of applications it is important to switch on the DC side of the rectifier or use a Quick Set device. Stearns rectifiers have a built in suppression circuit to protect the rectifier. However, it may still be necessary to protect the switching contacts with a separate suppression device. (see Figure 1 and Figure 2).

Figure 1

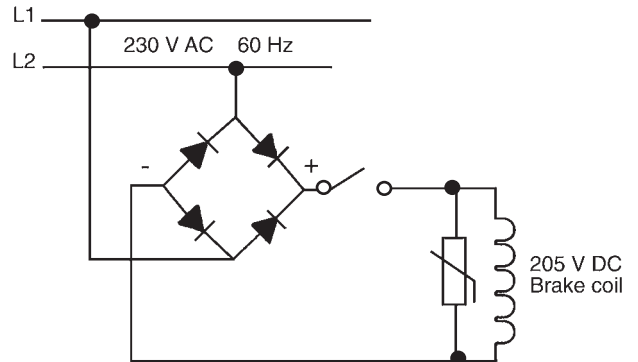
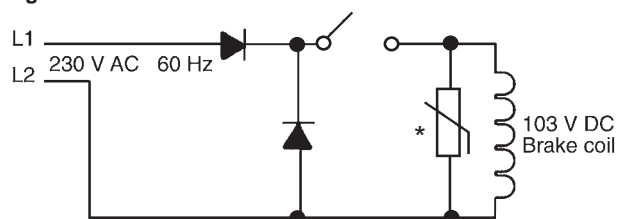
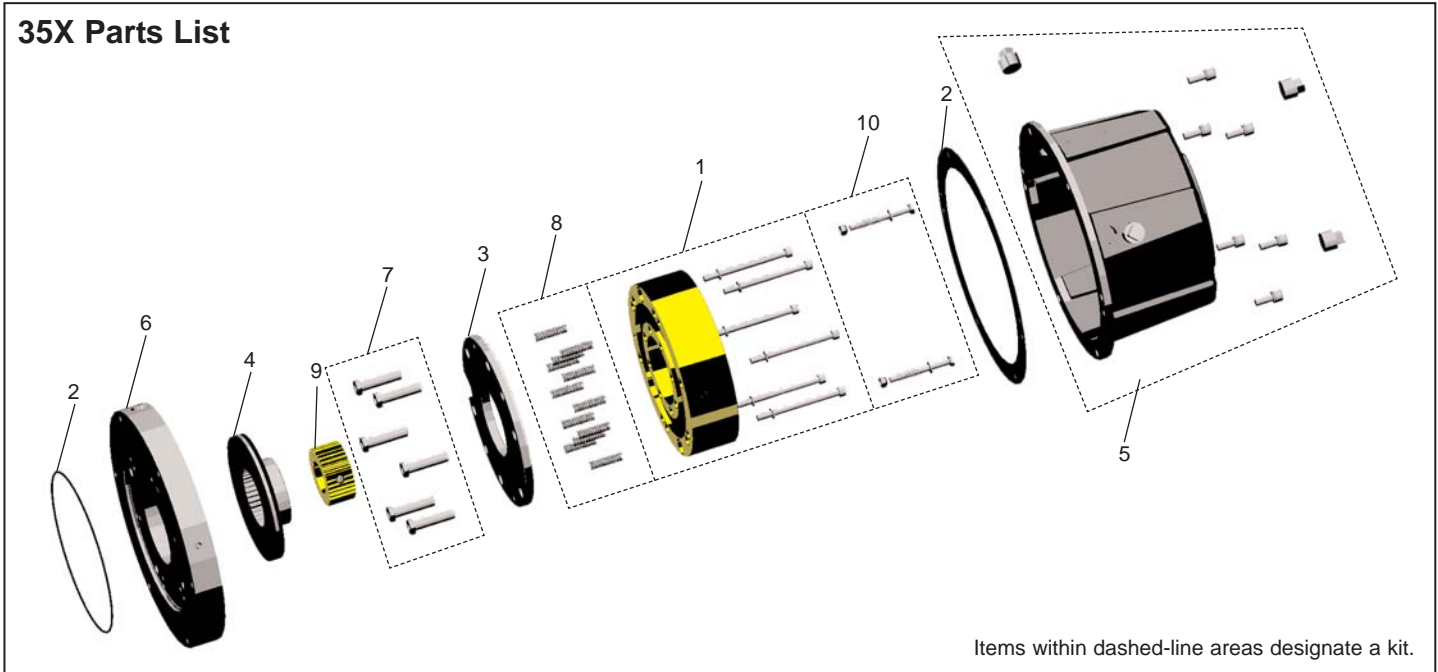


Figure 2



\* A suppression device is required when switching on the DC side of the line and using the half wave rectifier (412-0591-01K).

## 35X Parts List



Items within dashed-line areas designate a kit.

Table I

Item	Torque Rating Description	35X-7	35X-8	35X-9	
1	Mag body & coil assembly (see table J for voltage)	5-04-0986-00-0[ JK	5-04-0991-00-0[ JK	5-04-0996-00-0[ JK	
2	Gasket kit	5-77-0987-00	5-77-0992-00	5-77-0992-00	
3	Armature kit	8-405-986-OK	8-405-991-OK	8-405-996-OK	
4	Carrier disc kit	5-14-0985-OK	5-14-0990-OK	5-14-0995-OK	
5	Housing kit (aluminum)	8-007-116-OK	8-007-117-OK	8-007-117-OK	
5a	Housing kit (cast iron)	—	8-007-115-OK	8-007-115-OK	
6a	Adapter plate kit 7.25" B.C.	8-001-903-OK	—	—	
6b	Adapter plate kit 9.00" B.C.	8-001-904-OK	—	—	
6c	Adapter plate kit 11.00" B.C.	8-001-905-OK	8-001-905-OK	8-001-905-OK	
7	Adjust bolt kit	8-434-985-OK	8-434-990-OK	8-434-990-OK	
8	Spring kit	9-70-0985-OK	9-70-0990-OK	9-70-0995-OK	
9	Hub (see table K)	English bore	5-16-0981-01-01[ ]	5-16-0991-01-01[ ]	5-16-0995-01-01[ ]
		Metric bore	8-016-980-00-M[ ]	8-016-990-00-M[ ]	8-106-995-00M[ ]
10	Maintained release kit	9-17-9884-OK	9-17-9884-OK	9-17-9886-OK	

### Kit Contents

Item	Description
1	Mag body & coil assembly Mounting bolts (6) & lock washers (6)
2	O-ring Flat gasket
5	Housing Mounting bolts (6) & lock washers (6) Hole plugs
8	Outer & inner pole springs
10	Maintained release bolts, washers, springs & locknuts

Table J Coil Voltage & Current Ratings

Magbody & Coil Assembly Voltage Identifier -0[ JK		Current Rating		
Voltage	Insert	196	230	278
24 V DC	0 [E]K	3.30	4.27	3.85
90 V DC	0 [J]K	.82	1.05	1.19
103 V DC	0 [K]K	.75	.96	1.08
180 V DC	0 [L]K	.42	.54	.61
205 V DC	0 [M]K	.38	.49	.56
258 V DC	0 [S]K	.38	.40	.44
414/432 V DC	0 [B]K	.25	.26	.29

Table K

Bore Diameters			
English Bore	Insert [ ]	Metric Bore	Insert [ ]
1 3/8	G	30 mm	30
1 1/2	M	35 mm	35
1 5/8	H	38 mm	38
1 3/4	I	40 mm	40
1 7/8	J	42 mm	42
2	W	45 mm	45
2 1/8	N	48 mm	48
		50 mm	50
		55 mm	55
		60 mm	60
		70 mm	70



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